

What is claimed is:

1. An electrical-energy-storage unit comprising of components containing;

- calcined composition-modified barium titanate powder with;
- a first uniform coating of 100 Å of aluminum oxide; and
- a second uniform coating of 100 Å of calcium magnesium aluminosilicate glass; and
- screen-printed into interleaved multilayers of preferentially aligned nickel electrode layers 12 and double-coated calcined composition-modified barium titanate high-relative-permittivity layers 11 with the use of screening inks having the proper rheology for each of the layers; and
- dry and cut the green multilayer components 15 into a specified area; and
- sinter the green multilayer components 15 to closed-pore porous ceramic bodies; and
- hot isostatically press the closed-pore porous ceramic bodies into a void-free condition; and
- grind and polish each side of the component to expose the preferentially aligned interleaved nickel electrodes 12; and
- nickel side bars 14 are connected to each side of the components 15 that have the interleaved and preferentially aligned nickel electrodes 12 exposed by applying nickel ink with the proper rheology to each side and clamping the combinations together; and
- components and side nickel bar combination 14-15 are then heated at the proper temperature and time duration to bond them together; and
- wave solder each side of the conducting bars; and
- components 15 with the connected nickel side bars 14 are then assembled into the first array, Figure 3, utilizing unique tooling and solder-bump technology; and
- the first arrays are then assembled into the second array, Figure 4; and
- the second arrays are then assembled into the EESU final assembly

Sub B8
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Metals & Ceramics
Protective Surface
are unattainable

Indefinite

Sub B

Sub C

2. An electrical-energy-storage unit as recited in Claim 1 that will not degrade due to being fully charged or discharged.
3. An electrical-energy-storage unit as recited in Claim 1 that has the capability to be rapidly charged without incurring any damage or degrading the specifications to the components.
4. An electrical-energy-storage unit as recited in Claim 1 that due to the unique double coating of the basis particles and the hot isostatic pressing at the near-minimum-temperature viscous-flow condition of the glass, a dielectric voltage breakdown strength in the range of 1×10^6 to 5×10^6 V/cm or higher is allowed across the terminals of the components in this double-array configuration, Figure 4.
5. An electrical-energy-storage unit as recited in Claim 1 that has an ease of manufacturing due to the softening temperature of the calcium magnesium aluminosilicate glass allowing the relatively low hot-isostatic-pressing temperature of 800°C which in turn will provide a void-free ceramic body.
6. An electrical-energy-storage unit as recited in Claim 1 that has an ease of manufacturing due to the softening temperature of the calcium magnesium aluminosilicate glass allowing the relatively low hot-isostatic-pressing temperature of 800°C which in turn will allow the use of nickel for the conduction-path electrodes.
7. An electrical-energy-storage unit as recited in Claim 1 that has an ease of manufacturing due to the softening temperature of the calcium magnesium aluminosilicate glass allowing the relatively low hot-isostatic-pressing temperature of 800°C. This feature along with the coating method providing a uniform-thickness shell of the calcium magnesium aluminosilicate glass in turn will provide a hot-isostatic-pressed double-coated composition-modified barium titanate high-relative-permittivity layer that is uniform and homogeneous in microstructure.
8. An electrical-energy-storage unit as recited in Claim 1 that due to the double coating of the basis particles has reduced the leakage and aging of this material by an order of magnitude of the specification of the basis material or lower. This will reduce the discharge rate to 0.1% per 30 days or lower; and

9. An electrical-energy-storage unit as recited in Claim 1 that the relatively low 800° C hot-isostatic-pressing temperature allows nickel to be used as the electrode material rather than expensive platinum, palladium, or palladium silver alloy.

10. An electrical-energy-storage unit as recited in Claim 1 that due to the unique double-layered array configuration, Figure 4, can store up to 52,220 W•h of electrical energy or more depending on the size of the arrays or the value of the relative permittivity.

11. An electrical-energy-storage unit as recited in Claim 1 that does not have any material that is explosive, corrosive, or hazardous.

12. An electrical-energy-storage unit as recited in Claim 1 that can supply electrical energy to electrical vehicles, which include bicycles, tractors, buses, cars, or any device used for transportation or to perform work, that is not explosive, corrosive, or hazardous.

13. An electrical-energy-storage unit as recited in Claim 1 that can store electrical energy from electrical-energy-delivery systems and then be used to supply electrical energy to residential, commercial, industrial applications and the present power grid that is not explosive, corrosive, or hazardous.

14. An electrical-energy-storage unit as recited in Claim 1 that can store electrical energy from electrical-energy-delivery systems and then be transported to a required location and be used as a source of electrical energy that is not explosive, corrosive, or hazardous.

15. An electrical-energy-storage unit as recited in claim 1 that can supply electrical energy to portable electronic devices such as computers, radios, television sets, cameras, refrigerators, phones, lights, and other such devices.

16. An electrical-energy-storage unit as recited in claim 1 that can supply electrical energy to remote devices such as microwave repeaters, phones, traffic signals, recreational equipment, lighting systems, camping equipment, farming equipment, and other such devices.